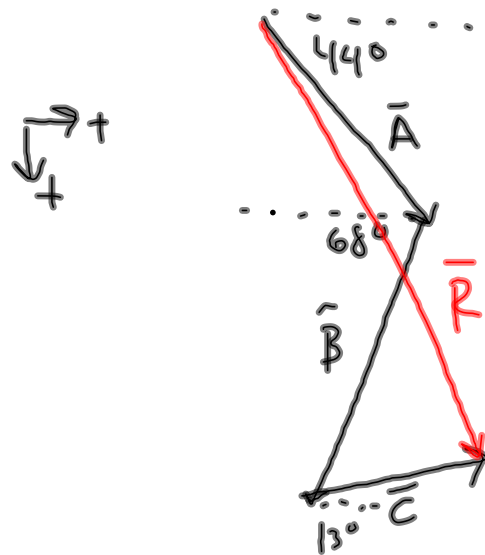


# 1:

$$\begin{aligned} A_x &= +16.5 \text{ m/s} \\ B_x &= -11.6 \text{ m/s} \\ C_x &= +13.6 \text{ m/s} \end{aligned}$$

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$$R_x = 18.5 \text{ m/s}$$

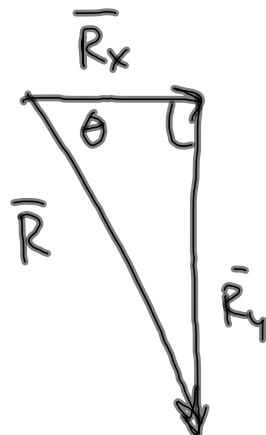
$$A_y = +16.0 \text{ m/s}$$

$$B_y = +28.7 \text{ m/s}$$

$$C_y = -3.1 \text{ m/s}$$

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$$R_y = 41.6 \text{ m/s}$$

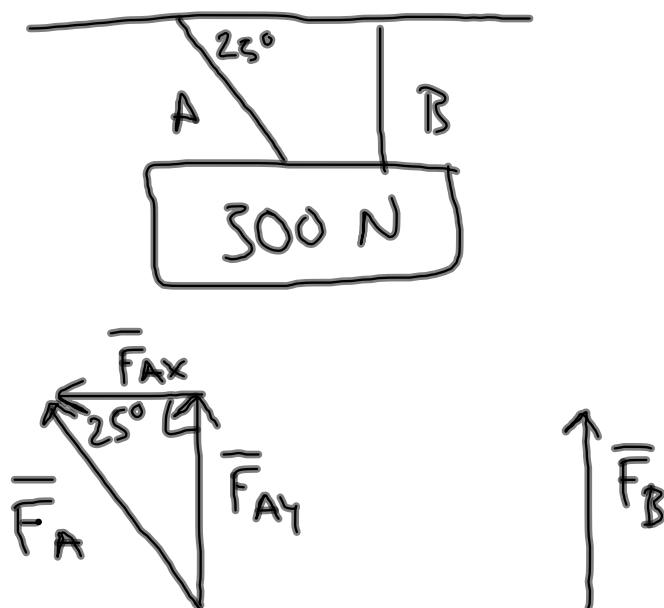


$$R = 45.5 \text{ m/s}$$

$$\theta = 66^\circ$$

S of E

$$\vec{R} = 45.5 \text{ m/s @ } 66^\circ \text{ S of E}$$

#2:

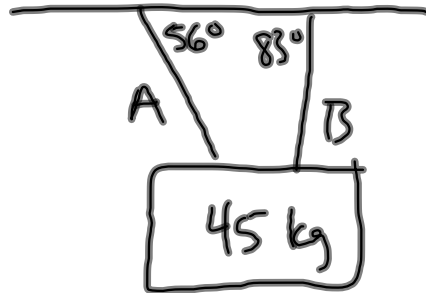
$$F_{Ay} = F_B = \frac{300 \text{ N}}{2} = 150 \text{ N}$$

$$\sin(25^\circ) = \frac{F_{Ay}}{F_A}$$

$$F_A = \frac{150 \text{ N}}{\sin(25^\circ)}$$

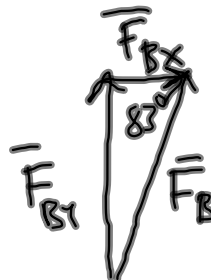
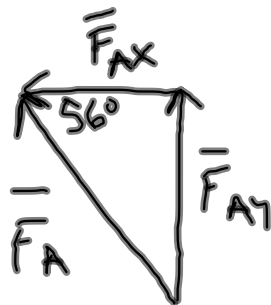
$$= 354.9 \text{ N}$$

#3:



$$\vec{F}_g = m a_g = (45 \text{ kg})(9.8 \text{ m/s}^2) = 441 \text{ N}$$

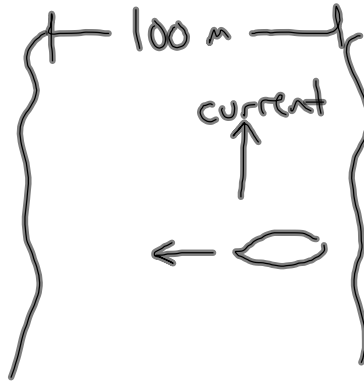
$$F_{Ay} = F_{By} = \frac{441 \text{ N}}{2} = 220.5 \text{ N}$$



$$\begin{aligned} \vec{F}_A &= \frac{F_{Ay}}{\sin(56^\circ)} \\ &= 266 \text{ N} \end{aligned}$$

$$\begin{aligned} \vec{F}_B &= \frac{F_{By}}{\sin(56^\circ)} \\ &= 222 \text{ N} \end{aligned}$$

#4:



$$V_B = 5.9 \text{ m/s} = V_x$$

$$V_C = 3.1 \text{ m/s} = V_y$$

$$a) \quad V_x = \frac{\Delta x}{\Delta t}$$

$$\Delta t = \frac{\Delta x}{V_x}$$

$$= \frac{100 \text{ m}}{5.9 \text{ m/s}}$$

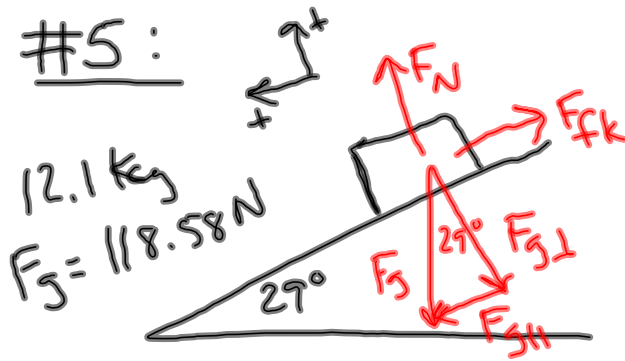
$$= 16.9 \text{ s}$$

$$b) \quad V_y = \frac{\Delta y}{\Delta t}$$

$$\Delta y = V_y \Delta t$$

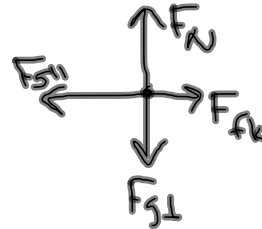
$$= (3.1 \text{ m/s})(16.9 \text{ s})$$

$$= 52.5 \text{ m}$$



$$\mu_k = 0.22$$

FBD:



$$\sum \vec{F}_{||} = m \vec{a}_{||}$$

$$a_{||} = \frac{\sum F_{||}}{m}$$

$$= \frac{F_{g||} - F_{fk}}{m}$$

$$F_{fk} = \mu_k F_N$$

$$= \frac{m a_g \sin(29^\circ) - \mu_k F_N}{m}$$

$$= \frac{m a_g \sin(29^\circ) - \mu_k m a_g \cos(29^\circ)}{m}$$

$$= a_g [\sin(29^\circ) - \mu_k \cos(29^\circ)]$$

$$= (9.8 \text{ m/s}^2) [\sin(29^\circ) - (0.22) \cos(29^\circ)]$$

$$= 2.87 \text{ m/s}^2$$

$$\sum F_{\perp} = 0$$

$$F_N - F_{g\perp} = 0$$

$$F_N = F_{g\perp}$$

$$= m a_g \cos(29^\circ)$$